

### **REMARKS**

Reconsideration and allowance of the present application in view of the following remarks and amendments are respectfully requested.

Currently, claims 1-25 remain pending in the present application including independent claim 12. Claims 1-11 and 24-25 remain withdrawn from further consideration. To facilitate examination, the Applicants provide the stated objection or rejection expressed by the Examiner in the Office Action mailed October 18, 2005, followed by the action to overcome the particular objection or rejection and place the application in condition for allowance.

#### **Specification**

The specification has been amended to include antecedent basis for the surgical gown included in claim 21 and correct other deficiencies. Please note that the identification of a surgical gown as a personal care product was included in original claims 11 and 21. Thus, Applicants submit that no new matter has been added to the specification.

#### **Claim Rejections – 35 USC § 102**

In the Final Office Action, claims 12 -23 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. US 2002/0087129A1 to Di Luccio et al. Di Luccio et al. is only a proper §102(e) reference on its face to the extent that Di Luccio et al. claims priority to provisional application No. 60/259,143 filed on December 29, 2000, a copy of which is attached as Appendix A. The attached provisional application, however, does not describe droplet volume in the range of from about 5

nanoliters to about 400 nanoliters. See Appendix A, page 3, line 21; page 12, line 4; page 15, line 9. Thus, Di Luccio et al. does not anticipate the currently pending claims.

Further, Di Luccio et al. and the presently pending application are co-owned by Kimberly Clark Worldwide, Inc., and both were subject to an obligation of assignment to Kimberly Clark Worldwide, Inc. at the time the invention was made. Thus, Di Luccio et al. is also not available as prior art under 35 U.S.C. § 103.

Additionally, in the Final Office Action, claims 12 and 14-23 were rejected under 35 U.S.C. §102(b) in view of U.S. Pat. No. 5,782,787 to Webster. Webster describes an absorbent wound dressing having discrete zones of polymeric material. It was stated that the discrete zones of polymeric material of Webster are synonymous with the droplets of independent claim 12 of the present application. However, it is respectfully submitted that Webster does not disclose droplets applied to a substrate.

As described above, Webster is directed to a wound dressing. The “zones” of Webster which are likened to droplets in the Office Action are “most preferably truncated square pyramids” of polymeric material. Col. 4, lines 1; 43-44. Indeed, “[o]ne process of manufacturing the dressings of [Webster], is by casting the polymeric material into appropriately shaped recesses in a sheet material.” Col. 7, lines 4-6. The zones/shapes of Webster “may be cubic, cylindrical, truncated pyramidal, hexagonal, and the like.” Col. 4, lines 40-41. Nowhere does Webster describe droplets being applied to a substrate so as to produce a substrate having topographical characteristics wherein the droplets are at least in part, a phase-change liquid and have a volume in the range of about 5 nanoliters to about 400 nanoliters.

As one of ordinary skill in the art would recognize, "droplet" refers to a tiny quantity of fluid that falls in one spherical mass. While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. The ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application. Applicants refer the Examiner's attention to the dictionary definitions of the terms "drop" and "droplet" provided herewith as Appendix B. By applying the ordinary and customary meaning of the term "droplets", it is apparent that the zones/shapes of Webster are not droplets because Webster does not describe a tiny quantity of fluid that falls in one spherical mass. As such, it is respectfully submitted that Webster does not anticipate independent claim 12 of the present application.

As stated, the Office Action of October 18, 2005 also rejected the dependent claims in the present application (claims 13-24) under 35 USC § 102(b) in view of Webster and Di Luccio et al. These claims depend either directly or indirectly from independent claim 12 and recite the present invention in varying scope. Applicants have herein discussed the cited reference in relation to claim 12. The dependent claims 13-24 are similarly distinguishable not only because of the patentability of the independent claims but also because of the combination of the subject matter of each of the dependent claims with

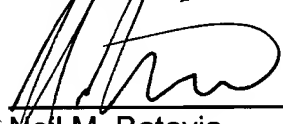
their independent claim which makes each claim further distinguishable, and which is not taught or suggested by the cited reference, singly or in combination.

For at least the reasons stated in above, Applicants respectfully submit that the present application is in complete condition for allowance. Should any issues or questions remain, however, after review of this Response, then Examiner Reichle is invited and encouraged to telephone the undersigned at her convenience.

Please charge any additional fees required by this Amendment to Deposit Account No. 04-1403.

3/2/2006  
Date

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## **ABSORBENT ARTICLE HAVING RELEASABLE MEDICINAL TREATMENTS**

### **BACKGROUND OF THE INVENTION**

5        Absorbent articles, such as infant diapers, adult incontinence garments, sanitary napkins, bedpads, panty liners, incontinent pads, and so forth are well known in the art. These articles are inexpensive, often disposable, and yet capable of absorbing and retaining fluids and other bodily exudates. These absorbent articles typically have a liquid impermeable backsheet, a body-side layer or topsheet and an absorbent core  
10        therebetween. Various topsheets are known in the art and they are commonly designed to provide good liquid handling properties and promote the flow of body exudates away from the skin and towards the absorbent core. However, with certain products, extended wear of a soiled article can cause the skin to be exposed to extremely high humidity and therefore cause wearers to experience some level of skin irritation including, but not limited to,  
15        erythema, diaper rash and loss of skin barrier. In addition, with regard to diapers and similar personal care products, while they efficiently take in and absorb urine they do not efficiently absorb bowel movements (BM) or adequately remove BM away from the skin.

      In order to address these issues, it is a common practice for caregivers to apply a lotion, cream and/or other medicament to the wearer's skin prior to putting the absorbent  
20        article on or adjacent the individual. As a particular example, it has been common for a caregiver to apply vaseline or mineral oil to those areas covered by the diaper prior to putting the diaper on the infant. This helps the skin by acting as a lubricant, improve or provide skin barrier as well as help prevent irritants from adhering to the wearer's skin. However, in an effort to avoid the need for manual application of skin protectants and/or  
25        other medicaments, emollients have been applied to the skin via the absorbent article itself. As an example, US Patent No. 3,585,998 teaches a disposable diaper having an interior layer with capsules of emollients that rupture under pressure. The emollient is then transferred to the skin by normal contact, wearer motion and/or body heat. As a further

example, US Patent No. 5,643,588 teaches coating a semi-solid emollient on the surface of a topsheet in a personal care article such that the emollient is likewise transferred to the wearer's skin by normal contact, wearer motion and/or body heat.

As a particular example, the PAMPERS Rash Guard diaper utilizes a topsheet  
5 containing emollients located on the body-side of the sheet and which are arranged on the topsheet in a striped pattern, where the stripes run in the article's longitudinal direction. Typically, stripes are applied wherein each stripe measures about 0.25 inches wide (i.e., in the articles lateral direction) and 11.75 inches long. The distance between the stripes is approximately 0.3 inches. Application of skin care compositions to diaper topsheets are  
10 further described in WO 99/45973.

One problem with application of emollients to the topsheet is that they often interfere with the intended function of the topsheet, namely to quickly and efficiently distribute liquids through the topsheet, away from the wearer, and to the absorbent core. The emollients as applied to the topsheet often form films or otherwise obstruct the pores due to their  
15 structural and hydrophobic properties and therefore application of emollients to topsheets often degrade the liquid handling properties of the topsheet. Thus, the benefits that can be obtained by applying emollients to the topsheet often compete with the liquid distribution and liquid-handling properties sought to be obtained by the topsheet. Accordingly, it is often necessary to limit the amount of emollient applied to the topsheet. However, in order to  
20 provide the desired therapeutic effect to the skin, adequate emollient needs to be available for and capable of release and transfer to the wearer's skin.

An additional problem with existing absorbent articles and processes is that the application of the emollients to the topsheet is uneven in terms of location and/or amount. Such an uneven application of emollient often results in a corresponding uneven transfer of  
25 the emollient to the skin. This is disadvantageous in that some areas of the skin may receive little or no emollient whereas other areas may receive excess amounts of emollient. Thus, the skin may have numerous areas that, by reason of not receiving an effective amount of emollient or an excessive amount of emollient, suffer one or more ailments. Further, the inability to uniformly apply the emollient also makes it difficult to efficiently utilize the  
30 emollients applied to the topsheet.

Therefore, absorbent articles are desired having body-side layers or topsheets with greater amounts of medicaments available for release without significantly detracting from the functional properties of the topsheet. Further, absorbent articles are desired having  
body-side layers or topsheets capable of providing significant release and transfer of  
35 medicaments to the wearer's skin. Still further, such body-side layers and/or topsheets are desired having a uniform application of medicaments thereon.

**SUMMARY OF THE INVENTION**

The aforesaid needs are fulfilled and the shortcomings of the prior art overcome by  
5 absorbent articles of the present invention comprising (i) a liquid-impervious backsheet; (ii)  
a topsheet having a body-facing surface, said topsheet comprising a porous material and  
having a medicinal composition pattern applied to a region of the body-facing surface of  
the topsheet in an effective amount and wherein said pattern comprises individual  
10 segments having at least one dimension less than about 1 millimeter (extending in the MD  
and CD plane); and (iii) an absorbent material positioned between the topsheet and said  
backsheet. In a further aspect, the patterned application of the medicinal composition can  
comprise a plurality of substantially continuous lines having a width less than 0.9  
millimeters. Still further, the medicinal composition may be present upon said body-facing  
15 surface of said topsheet in an amount between about 0.05 mg/cm<sup>2</sup> and about 50 mg/cm<sup>2</sup>.  
In yet a further aspect, the patterned medicinal composition is desirably substantially  
uniformly applied to the selected regions. In a particular aspect, the pattern can comprise  
a matrix of discrete segments and further the discrete segments can have a length and  
width less than 0.9 mm. In a further aspect, the discrete segments can comprise round or  
20 dot-like segments and also have a substantially rounded cross-sectional shape. In yet a  
further aspect, the discrete segments of medicinal composition may each have a volume  
of between 3 and about 200 picoliters.

In a further aspect of the invention, an absorbent article is provided comprising (i) a  
liquid-impervious backsheet; (ii) a topsheet having a body-facing surface, said topsheet  
25 comprising a porous material and having medicinal composition upon the body-facing  
surface of the topsheet in an effective amount and wherein said pattern comprises a  
matrix of discrete segments having a volume of between 3 and 200 picoliters; and (iii) an  
absorbent material positioned between said topsheet and said backsheet. The discrete  
segments may have a substantially semicircular cross-section extending above the body-  
facing surface of the topsheet. Further, the discrete segments may comprise substantially  
30 round segments (in the MD and CD plane). Still further, discrete segments are desirably  
positioned upon said topsheet in a frequency between 10 and 100 drops per cm<sup>2</sup>. Still  
further, the discrete segments of medicinal composition may be limited to selected regions  
of the topsheet. Further, the medicinal composition can be applied to the selected regions  
in a series of spaced lines extending across the body-facing surface of the topsheet.

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**DESCRIPTION OF THE INVENTION****Definitions**

5           As used herein and in the claims, the term "comprising" is inclusive or open-ended and does not exclude additional unrecited elements, compositional components, or method steps. Accordingly, the term "comprising" encompasses the more restrictive terms "consisting essentially of" and "consisting of."

10           As used herein, all percentages, ratios and proportions are by weight unless otherwise specified.

          As used herein, the term "medicament" refers to any compound or composition that provides a benefit or therapeutic effect upon and/or to the skin by physical contact with the skin. This benefit or therapeutic effect can be achieved upon initial application and/or over time with continued use.

15           As used herein, the term "fabric" means a material comprising a network of fibers including, but not limited to, woven or knitted materials, tufted or tufted-like materials, nonwoven webs, and so forth.

          As used herein, the term "nonwoven" fabric or web means a web having a structure of individual fibers or threads which are interlaid, but not in an identifiable manner as in a  
20           knitted or woven fabric. Nonwoven fabrics or webs have been formed by many processes such as, for example, meltblowing processes, spunbonding processes, hydroentangling, air-laid and bonded carded web processes.

          As used herein, the term "porous" refers to a substrate or material that has interstitial spaces or openings located therein such that there exist pathways that extend through the  
25           entire thickness of the material, the interstitial spaces need not extend through the entirety of the material and can collectively form pathways through the thickness of the material via adjacent, inter-connecting spaces.

          As used herein, the term "machine-direction" or MD means the direction of a fabric in the direction in which it is produced. The term "cross-direction" or CD means the direction of  
30           a fabric generally perpendicular to the MD.

          As used herein, the term "body-side" or "inner-side" refers to the side of a material that will face the wearer of the article and the term "outer-side" refers to the opposing side that faces away from the body, i.e. distal to the body when the article incorporating the material is worn.



As used herein, the term "personal care product" means personal hygiene oriented items such as wipes, diapers, training pants, absorbent underpants, adult incontinence products, feminine hygiene products, and so forth.

5 **Brief Description of the Drawings**

FIG. 1 is a drawing of an absorbent article of the present invention having a topsheet with a medicinal treatment thereon and wherein a portion of the body-facing surface of the topsheet is depicted in an enlarged view.

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FIG. 2 is a cross-sectional view of a topsheet having a medicament composition thereon.

FIG. 3 is a schematic representation illustrating an exemplary method for applying a medicinal treatment to a porous sheet.

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**Absorbent Articles**

Absorbent articles generally include a liquid permeable topsheet, which faces the wearer, and a backsheet or outer cover. Disposed between the topsheet and outer cover is an absorbent core, often the topsheet and outer cover are sealed to encase the absorbent core. Although the following detailed description will be made in the context of a disposable diaper, one skilled in the art will appreciate that the concepts of the present invention would also be suitable for use in connection with other types of absorbent articles, particularly other personal care products. In addition, although the present invention is described in the context of several specific configurations, it will also be appreciated that further combinations or alterations of the specific configurations discussed below may be made by one skilled in the art without departing from the spirit and scope of the present invention.

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In reference to FIG. 1, diaper 10 may comprise a backsheet or outer cover 12, a liquid permeable topsheet 14 positioned in facing relation to outer cover 12, and an absorbent core 18 positioned between outer cover 12 and topsheet 14. Diaper 10 may be of various shapes as desired such as, for example, an overall rectangular shape, T-shape or an hourglass shape. Topsheet 14 is generally coextensive with the outer cover 12 but may optionally cover an area that is larger or smaller than the area of outer cover 12, as desired. Portions of diaper 10, such as a marginal section of the outer cover 12, may extend past the terminal edges of the absorbent core 18. In the illustrated embodiment, for example, outer cover 12 can extend outwardly beyond the terminal marginal edges of the absorbent core 18 to form side margins 22 and end margins 24 of the diaper 10. A treated region 16 containing

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medicinal treatment 17 is located upon a selected portion of the body-facing side of topsheet 14.

5       Topsheet 14 preferably presents a body-facing surface that is compliant, soft to the touch, and non-irritating to the wearer's skin. Topsheet 14 should have good liquid distribution and handling properties and, desirably, is also capable of isolating the wearer's skin from liquids held in the absorbent core 18. In order to present a dryer surface to the wearer, the topsheet 14 may be less hydrophilic than the absorbent core 18 and also sufficiently porous to be readily liquid permeable. Various topsheets are well known in the art and may be manufactured from a wide variety of materials, such as porous foams, reticulated foams, apertured plastic films, natural fiber fabrics (e.g., wool or cotton fibers), synthetic fiber fabrics (e.g., polyester, polypropylene, polyethylene, etc.), or fabrics comprising a combination of natural and synthetic fibers. Desirably the topsheet comprises a highly open or porous fabric having numerous interstitial spaces therein. For example, the topsheet may comprise a high-loft spunbonded web of polyolefin fibers or a bonded-carded web of thermoplastic polymer fibers. In this regard, the topsheet may be composed of substantially hydrophobic material treated with a surfactant or otherwise processed to impart the desired level of wettability and/or permeability. Exemplary topsheets include, but are not limited to, those described in US Patent No. 5,879,343; US Patent No. 5,490,846; US Patent No. 5,364,382 and commonly assigned US Patent Application No. 09/209,177 filed December 9, 1998; the entire contents of each of the aforesaid patents and applications are incorporated herein by reference. As a particular example, an exemplary liner may comprise two or more layers wherein the body-facing layer comprises a low-density nonwoven web of hydrophobic fibers and the underlying layer comprises a low-density nonwoven web of hydrophilic fibers.

25       Backsheet or outer cover 12 desirably comprises a liquid-impervious material and, even more desirably, comprises a breathable liquid-impervious material. The outer cover can itself comprise a single layer or a multilayer structure, e.g. a multilayer laminate. In reference to the particular embodiment depicted in FIG. 1, outer cover 12 may comprises a breathable liquid-impervious film 26 and one or more additional fabric layers 28. The particular structure and composition of the outer cover may be selected from various combinations of films and/or fabrics. The individual layers or laminates can be selected to provide a material having the desired attributes such as, for example, strength, abrasion resistance, water vapor transmission rate, tactile properties and/or aesthetics. Exemplary materials suitable for use as outer covers or as a component of an outer cover include, but are not limited to, those described in US Patent No. 5,213,881; US Patent No. 4,777,073; US Patent No. 5,855,999 and US Patent No. 6,075,179; the entire contents of each of the

aforesaid patents are incorporated herein by reference. As a particular example, an exemplary outer cover material can comprise a breathable film laminate having a microporous polyolefin film laminated to a nonwoven web of polyolefin spunbond fibers.

Between outer cover 12 and topsheet 14 is positioned an absorbent core 18 which includes an absorbent material. Suitable absorbent materials include, but are not limited to, superabsorbent particles, wood pulp fluff fibers, synthetic wood pulp fibers, synthetic fibers and combinations thereof. Exemplary superabsorbent particles include, but are not limited to, silica gels, polyacrylamides, polyvinyl alcohol, ethylene maleic anhydride copolymers, polyvinyl ethers, hydroxypropyl cellulose, acrylonitrile grafted starch, acrylic acid grafted starch, polyacrylates, and mixtures or combinations thereof. Superabsorbent particles are commonly used in conjunction with other absorbent materials such as, for example, pulp fluff. In this regard, a mixture of pulp fluff and superabsorbent particles is commonly employed as an absorbent core in personal care articles such as diapers and incontinence garments. Superabsorbent materials may be substantially homogeneously mixed with other hydrophilic fibers or may be selectively placed into desired zones of the absorbent body to better contain and absorb body exudates. The concentration of the superabsorbent materials may also vary through the thickness of the absorbent core. Alternatively, the absorbent core may comprise a laminate of fibrous webs and superabsorbent materials or other suitable means for maintaining superabsorbent in localized areas. Additionally, when utilizing pulp or other like absorbents it is often advantageous to add a stiffer reinforcing fabric or material to the absorbent core in order to maintain the integrity of the absorbent after taking in liquid. The absorbent core may have any of a number of shapes. For example, the absorbent core may be rectangular, I-shaped, or T-shaped. It is generally preferred that the absorbent core be narrower in the crotch area than in the front or rear portions of the diaper. The size of the absorbent core and selection of materials therein will vary with the desired loading capacity, the intended use of the absorbent article and other factors known to those skilled in the art.

While the basic structure of a diaper has been discussed herein above, it will be understood by those skilled in the art that numerous other components and/or structures may be utilized in the absorbent articles and personal care articles of the present invention. Notably, with regard to diapers, it will be readily appreciated that the diaper could include additional components such as for example elasticized side-panels, fasteners and/or elasticized leg cuffs that help secure the diaper to the wearer and reduce leakage from the diaper. As a further example, the diaper can include longitudinally extending containment flaps which are configured to maintain a substantially upright, perpendicular arrangement along the central portion of the diaper to serve as an additional barrier to the lateral flow of

body exudates. These and other components are well known and the manner and method of using the same in connection with the absorbent article of the present invention will likewise be readily appreciated by those skilled in the art. By way of example only, exemplary personal care articles and components thereof are described in US Patent No. 4,798,603, US Patent No. 4,753,649, US Patent No. 4,704,116 and US Patent No. 5,429,629; the entire contents of each of the aforesaid patents are incorporated herein by reference.

### **Medicaments**

Numerous medicaments are known that are capable of providing therapeutic or health benefits to the skin. As used herein, medicaments include, but are not limited to, those compositions and materials capable of softening, soothing, moisturizing, coating (e.g. preventing or inhibiting irritants from adhering to the skin or otherwise degrading the health or barrier properties of the skin), pH balancing, lubricating (e.g. to reduce chapping of the skin by rubbing of clothing upon the skin), and/or cleaning the skin. Examples of specific classes of medicaments include, but are not limited to, the following: astringents, antiseptic agents, antioxidants, antimicrobial agents, antifungal agents, deodorants, enzyme inhibitors, emollients and so forth. These and other medicaments or skin health benefit agents are known in the art.

In order that the medicaments applied to the body-side surface stay upon the exposed portion of the porous fabric and do not substantially migrate into or through the topsheet. The medicaments will typically be provided in the form of a composition including one or more skin health benefit agents as well as additional surfactants, stabilizers, viscosity modifiers and/or other agents to achieve the desired physical properties. The medicament compositions desirably comprise high viscosity liquids or emulsions, semi-solids or solids at room temperature and which are capable of being extruded as a liquid. In this regard, the medicament compositions should have a melting point of at least about 30°C and desirably has a melting point between about 30°C and about 100°C, and still more desirably has a melting point between about 40°C and about 80°C. In addition, the medicament compositions are desirably capable of adequately adhering to the topsheet such that the medicament does not substantially migrate into or through the topsheet. However, the medicament compositions are desirably not so solid nor does it adhere so strongly to the topsheet that it prevents the medicament from being transferred from the topsheet to the skin when the article is worn. In this regard, the medicament compositions desirably have a viscosity of from about 10 to about 10,000 centipose and more desirably between about 75 and about 500 centipose at a temperature of 60°C. In addition, the penetration hardness of

the medicament composition desirably ranges between about 5 and about 350 millimeters and still more desirably between about 5 and about 150 millimeters.

As a specific example, the body-side portion of a liner or topsheet can be provided having a hydrophilic lotion formulation on the surface thereof wherein the hydrophilic lotion formulation comprises 10 to 90 weight percent of a hydrophilic solvent, from about 5 to 90 weight percent of a polyethylene glycol having a molecular weight of at least 720 and from about 20 to about 60 weight percent of a fatty alcohol. The hydrophilic solvent component desirably comprises one or more propylene glycols and/or low molecular weight polyethylene glycols. The fatty alcohol desirably comprises an alcohol having a carbon chain length of from about C<sub>14</sub> - C<sub>30</sub> including, but not limited to, cetyl alcohol, stearyl alcohol, arachidyl alcohol, behenyl alcohol and mixtures thereof. Hydrophilic lotion formulations of this nature are described in more detail in commonly assigned US Patent Application No. 09/298,313; the entire contents of the aforesaid application is incorporated herein by reference.

As a further specific example, a body side liner can be provided having a lotion formulation on the outer surface thereof wherein the lotion formulation comprises 5 to 95 weight percent of an emollient, 5 to 95 weight percent of a wax and, 0 to 25 weight percent of a viscosity enhancer. Suitable emollients include, but are not limited to, petrolatum based oils, vegetable based oils, mineral oils, silicon oils, kaolin, lanolin, and mixtures thereof. Exemplary waxes include, but are not limited to, bayberry wax, beeswax, C<sub>30</sub> alkyl dimethicone, carnuba wax, ceresin, hydrogenated cottonseed oil, lanolin wax, paraffin, rice bran wax, synthetic spermaceti wax, microcrystalline wax and mixtures and combinations thereof. Suitable viscosity enhancers include, but are not limited to, polyolefin resins and polymers, ethylene vinyl acetate, silica, talc, colloidal silicon dioxide, zinc stearate, cetyl hydroxy ethyl cellulose, and combinations and mixtures thereof. Such lotion formulations are described in more detail in commonly assigned US Patent No. 6,149,934 and US Patent Application Nos. 09/379,431 and 09/671,357; the entire contents of the aforesaid patents and applications are incorporated herein by reference.

As further specific examples, the medicament composition can comprise a high viscosity oil-in-water emulsion comprising a skin health benefit agent, a surfactant and water. Exemplary oil-in-water medicaments are also described in US Patent Application No. 09/596,162, the entire contents of which are incorporated herein by reference. While various medicaments and/or medicament compositions are disclosed herein it will be appreciated that other medicaments and/or medicament compositions can be used in conjunction with the present invention. Additional medicament compositions include, but

are not limited to, those described in US patent Application Nos. 09/382,018 and 09/379,929; the entire contents of each of which are incorporated herein by reference.

**Application to Topsheet**

5           The medicament and/or medicament composition is applied to the substrate in a manner to allow the release of the medicaments from the substrate onto the wearer's skin through normal contact, wearer motion and/or body heat. Thus, the medicament and/or medicament composition is desirably applied to the body-side surface of the topsheet such that the majority of the medicament remains at or immediately adjacent the surface of the  
10 body-side surface of the topsheet. Still more desirably, the medicament and/or medicament composition is applied in a manner to form a portion extending above the fabric having a substantially rounded or substantially semi-circular cross-sectional shape. Further, the amount of medicament and/or medicament composition applied to the body-side surface of the topsheet is determined by considering the percent of the medicament normally released  
15 during use as well the amount of medicament necessary to provide a benefit to skin health. As used herein, the term "effective amount" means an amount capable of providing a therapeutic benefit to the skin and takes into account the amount of medicament or medicament composition needed to be delivered to the skin in order to achieve the benefit as well as the percent of medicament normally released from the substrate and delivered to  
20 the skin. While the effective amount for any given medicament or medicament composition may vary, typically it will be desirable to apply the medicament or medicament composition to the body-side surface of the topsheet in an amount between about 0.05 mg/cm<sup>2</sup> and about 50 mg/cm<sup>2</sup> and still more desirably between about 1 mg/cm<sup>2</sup> and about 25 mg/cm<sup>2</sup>.

          In addition, it is desirable that the amount of medicament and/or medicament  
25 composition upon the body-side surface of the topsheet is provided such that it is uniformly present across the applied area, i.e. the treated regions. Desirably, the amount of medicinal composition per square centimeter varies by less than about 5% from the average amount of medicinal composition per square centimeter and still more desirably varies by less than about 2% from the average amount of medicinal composition per square centimeter.  
30 The medicament or medicament composition is desirably applied to the body-contacting regions of the diaper and more desirably upon the body contacting region of the topsheet. The medicament or medicament composition can be applied across the entire body-contacting regions of the topsheet or across limited or selected regions. Desirably, the medicament and/or medicament composition is applied in lines extending substantially in the  
35 machine direction. However, the medicament and/or medicament compositions can be

applied in any of numerous patterns and including aesthetically pleasing patterns and images.

5 The medicament or medicament composition is preferably applied to the substrate in a desired pattern upon the topsheet wherein at least one of the dimensions of the pattern, in terms of length (L) and width (W), is less than about 0.1 centimeter. The patterns desirably  
comprise a series of continuous and/or substantially continuous lines. The lines can comprise parallel lines and/or intersecting lines and further the lines can be straight, zigzag, sinusoidal or curved. Further, the lines can be provided upon the topsheet in directions parallel, perpendicular or angled to the machine direction of the topsheet. Further, the  
10 medicaments or medicament compositions can be applied in a controlled random manner wherein the amount of medicament per unit area is controlled but the specific orientation and direction of the medicament applied thereto experiences some degree of variation and is not a repeating pattern. The patterned areas can themselves comprise a dot matrix pattern or closely spaced and/or overlapping lines which are not visible to the naked eye.  
15 Desirably the medicament is applied to the substrate in a series of continuous or substantially continuous lines having a width less than about 1 mm and still more desirably a width between about 0.9 mm and 0.05 mm even more desirably a width between about 0.5 mm and 0.1 mm. The individual lines can be spaced as desired and desirably have a spacing less than about 2.5 cm and still more desirably about 1 cm or less.

20 The medicaments can be applied to the body-side surface of the topsheet using various forms of equipment capable of a precise, uniform application of a liquid in a desired pattern. Such equipment includes, but is not limited to, equipment commonly used for the registered application of adhesives as well as print heads and printing devices such as, for example, continuous ink-jet (CIJ) printers, drop-on-demand (DOD) printers, electrostatic  
25 printers and so forth. Specific equipment suitable for use in the present invention includes, by way of example only, MELTEX EP11 coating die, CONTROL WEAVE (CW-200) Applicators and the Hot Melt Rotary Screen Coating System all from Nordson Corporation of Norcross, GA. With regard to the CW-200 applicators from Nordson Corporation, in order to achieve the precise application required for the present invention, it is preferable to run the  
30 applicator with the draw air off. As a further example, suitable applicators also include PHASER 5 print heads available from Tektronix, Inc. With regard to the print heads it is possible to run the print head in a continuous process.

As indicated above, the patterned regions can themselves comprise a matrix or assemblage of individual dots or lines. Desirably, the patterned regions comprise  
35 medicament and/or medicament compositions applied in a matrix of discrete dots or segments. Such a matrix or pattern is believed to lessen the loss of liquid handling

properties in the treated areas. In this regard, the matrix can have a dot resolution of up to about 600 drops/inch. Further, each of the drops or segments desirably contain substantially the same amount of medicament and/or medicament composition. The individual dots or segments desirably comprise from about 3 to 200 pL of the medicament or medicament composition. Still further, the medicaments and/or medicament compositions are applied to the topsheet such that the dots or segments have a cross-section having a round or hemispherical shape extending above the body-side surface of the topsheet.

In reference to FIG. 2, a cross-sectional representation of a topsheet 40 is provided wherein the body-side surface 42 of the topsheet 40 contains medicament composition 44 having a hemispherical shape extending there above. By providing dots and/or segments having a rounded shape a larger amount of the medicament and/or medicament composition is provided per surface area of the topsheet relative to medicaments applied and having a flat structure. By utilizing small drops and/or segments the melted or liquid medicament and/or medicament composition cools and/or solidifies quicker thereby allowing formation of the round shape above the body-side surface of the topsheet. The small size is further believed to facilitate transfer of the entire segment and/or dot. In addition, by utilizing numerous discrete dots or segments within the treated area the area of exposed edges is increased. In this regard, the increased edge area is believed to facilitate removal of the treatment from the sheet to the wearer, particularly when transfer is facilitated by mechanical action, i.e. movement of the body against the topsheet.

A process for forming the topsheets of the present invention is depicted in FIG. 3. Porous fabric 54, such as a nonwoven web, is unwound from roll 52 and fed onto a moving belt or screen 56. The belt 56, with porous fabric 54 thereover, travels under applicator 58 and medicament composition 60 is applied to the upper surface 57 of porous fabric 54. The medicament composition 60 is then cooled or dried, if needed, and in this regard most often the medicament composition will cool and resolidify quickly after exposure to ambient air. The treated porous fabric 62 may subsequently be wound on a winder roll (not shown) forming roll 64 of treated fabric. In the alternative, the treated porous fabric can be converted immediately without first being wound and stored in that form. Alternatively, the topsheet can be treated in the finished article. A personal care article, such as a diaper, can be fabricated and travel along a belt in an uncontracted state and with the topsheet facing-up. Application of the medicament composition upon the exposed topsheet can be applied via the equipment described herein above using registered treatment techniques as are known in the art. While a particular process of fabricating a treated porous fabric is disclosed herein, it will be appreciated to those skilled in the art that various modifications and/or changes can be made without departing from the spirit of the present invention. As an example, the



porous fabric can be made in-line instead of having been previously made and wound in roll form. Still further, the body-side layer of a topsheet can be treated and medicament composition applied thereto in the converted form using registered application methods.

5 In addition, to facilitate removal of the medicament and/or medicament treatments from the porous fabric, a surfactant can be applied to the fabric prior to deposition of the medicament or medicament composition. The surfactant can be used to modify the affinity of the medicament or medicament composition for the porous material comprising the topsheet. In this regard, the medicament or medicament composition desirably has sufficient affinity for the porous material such that the treatment stays upon the topsheet, but not such  
10 a high affinity that it does not transfer to the skin. Desirably, the medicament or medicament composition has a higher affinity for the skin than the matter comprising the porous material. A surfactant believed suitable for use with the present invention includes CETIOL, available from the Henkel Corporation, and comprises an ethoxylated ester derivative of myristic acid. Additional surfactants believed suitable with the present invention include, but are not limited  
15 to, silicone and polyethylene glycol based surfactants. The surfactant can be uniformly treated across the body contacting regions of the topsheet or, in the alternative, can be applied so as to overlap only those regions that will contain the medicinal treatments.

While various patents and other reference materials have been incorporated herein by reference, to the extent there is any inconsistency between incorporated material and  
20 that of the written specification, the written specification shall control. In addition, while the invention has been described in detail with respect to specific embodiments thereof, it will be apparent to those skilled in the art that various alterations, modifications and other changes may be made to the invention without departing from the spirit and scope of the present invention. It is therefore intended that the claims cover or encompass all such  
25 modifications, alterations and/or changes.

We claim:

1. An absorbent article, comprising:  
a liquid-impervious backsheet;  
a topsheet having a body-facing surface, said topsheet comprising a porous  
5 material and having medicinal composition patterned applied to a region of the body-  
facing surface of the topsheet in an amount between about 0.05 mg/cm<sup>2</sup> and about 50  
mg/cm<sup>2</sup> and wherein said pattern comprises individual segments having at least one  
dimension of about 1 millimeter or less; and  
an absorbent material positioned between said body-side layer and said backsheet.  
10
2. The absorbent of claim 1 wherein said pattern comprises a plurality of substantially  
continuous lines having a width less than 0.9 millimeters.
3. The absorbent of claim 2 wherein said pattern of substantially continuous lines have  
15 a width less than about 0.5 millimeters.
4. The absorbent article of claim 1 wherein said medicinal composition is present upon  
said body-facing surface of said topsheet in an amount between about 1 and 25 mg/cm<sup>2</sup>.
- 20 5. The absorbent article of claim 1 wherein each square centimeter of said region  
containing said patterned medicinal composition has a substantially uniform application of  
medicinal composition and wherein the amount of medicinal composition varies by less  
than about 5% from the average amount of medicinal composition per square centimeter.
- 25 6. The absorbent article of claim 4 wherein each square centimeter of said region  
containing said patterned medicinal composition has a substantially uniform application of  
medicinal composition and wherein the amount of medicinal composition varies by less  
than about 2% from the average amount of medicinal composition per square centimeter.
- 30 7. The absorbent article of claim 1 wherein said pattern comprises a matrix of discrete  
segments and further wherein the discrete segments have a length and width less than  
0.9 mm.
8. The absorbent article of claim 7 wherein said discrete segments have a substantially  
35 rounded cross-sectional shape extending above said body-facing surface of the topsheet.

9. The absorbent article of claim 8 wherein said discrete segments have a volume of between 3 and about 200 picoliters.
10. An absorbent article, comprising:  
5 a liquid-impervious backsheet;  
a topsheet having a body-facing surface, said topsheet comprising a porous material and having medicinal composition upon the body-facing surface of the topsheet in an effective amount and wherein said pattern comprises a matrix of discrete segments having a volume of between 3 and 200 picoliters; and  
10 an absorbent material positioned between said topsheet and said backsheet.
11. The absorbent article of claim 10 wherein said discrete segments have a substantially semicircular cross-section extending above the body-facing surface of the  
15 topsheet.
12. The absorbent article of claim 11 comprise discrete segments comprise substantially round segments.
13. The absorbent article of claim 11 wherein said discrete segments are positioned  
20 upon said topsheet in a frequency between 10 and 100 drops per cm<sup>2</sup>.
14. The absorbent article of claim 13 wherein said discrete segments are located only upon selected regions of the topsheet.
- 25 15. The absorbent article of claim 14 wherein said discrete segments are located only within spaced lines extending across the topsheet and wherein said lines have a width less than about 1 mm.

**ABSTRACT**

An absorbent article is provided, such as a personal care product, having a porous topsheet with a body-facing surface and a medicinal composition thereon. The medicinal  
5 composition is uniformly applied to the body facing surface of the topsheet in a pattern such as in a series of closely spaced, thin lines. In addition, the medicinal composition can be applied via one or more techniques so as to provide numerous discrete segments of medicinal composition having a substantially rounded or semicircular shape that extends  
10 above the body-facing surface of the topsheet. The uniform pattern application of the medicinal composition minimizes the loss in liquid handling properties of the porous topsheet and can improve the transfer rate of the medicinal composition from the topsheet to the skin.



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Main Entry: **1drop** ㉑

Pronunciation: 'dräp

Function: *noun*Usage: *often attributive*Etymology: Middle English, from Old English *dropa*; akin to Old High German *tropfo* drop**1 a** (1) : the quantity of fluid that falls in one spherical mass(2) *plural* : a dose of medicine measured by drops;*especially* : a solution for dilating the pupil of the eye **b** : a

minute quantity or degree of something nonmaterial or

intangible **c** : a small quantity of drink **d** : the smallest

practical unit of liquid measure

**2** : something that resembles a liquid drop: as **a** : a pendentornament attached to a piece of jewelry; *also* : an earringwith such a pendant **b** : a small globular cookie or candy**3** [<sup>2</sup>drop] **a** : the act or an instance of dropping : **FALL** **b** : adecline in quantity or quality **c** : a descent by parachute;*also* : the people or equipment dropped by parachute **d** : a

place or central depository to which something (as mail,

money, or stolen property) is brought for distribution or

transmission; *also* : the act of depositing something at sucha place <made the *drop*>**4 a** : the distance from a higher to a lower level or throughwhich something drops **b** : a fall of electric potential**5** : a slot into which something is to be dropped

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**6** [<sup>2</sup>drop] : something that drops, hangs, or falls: as **a** : a movable plate that covers the keyhole of a lock **b** : an unframed piece of cloth stage scenery; *also* : **DROP CURTAIN** **c** : a hinged platform on a gallows **d** : a fallen fruit

**7** : the advantage of having an opponent covered with a firearm; *broadly* : **ADVANTAGE**, **SUPERIORITY** -- usually used in the phrase *get the drop on*

- **at the drop of a hat** : as soon as the slightest provocation is given : **IMMEDIATELY**

- **drop in the bucket** : a part so small as to be negligible

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## droplet

One entry found for **droplet**.Main Entry: **drop·let** ˈdɹɑp-lət

Pronunciation: 'dräp-lət

Function: *noun*

: a tiny drop (as of a liquid)

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